

**Powering your application using
Energy Harvesting technology**

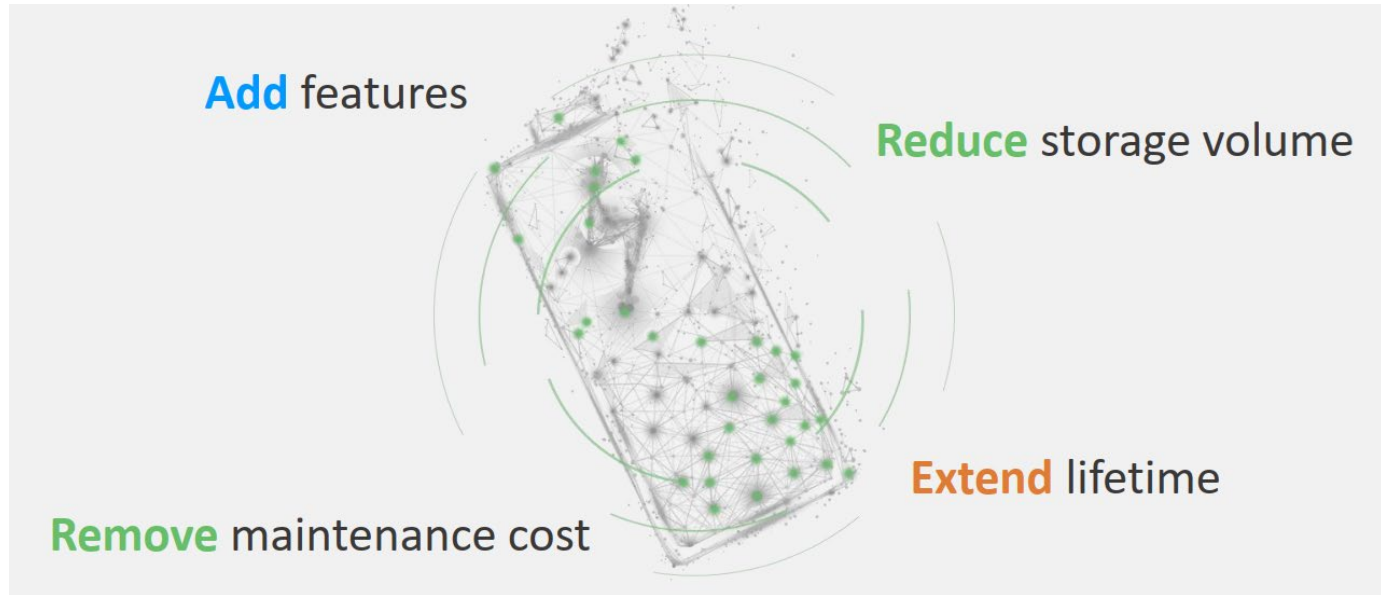
COMPUTER
CONTROLS 




**ENABLING
YOUR SUCCESS**

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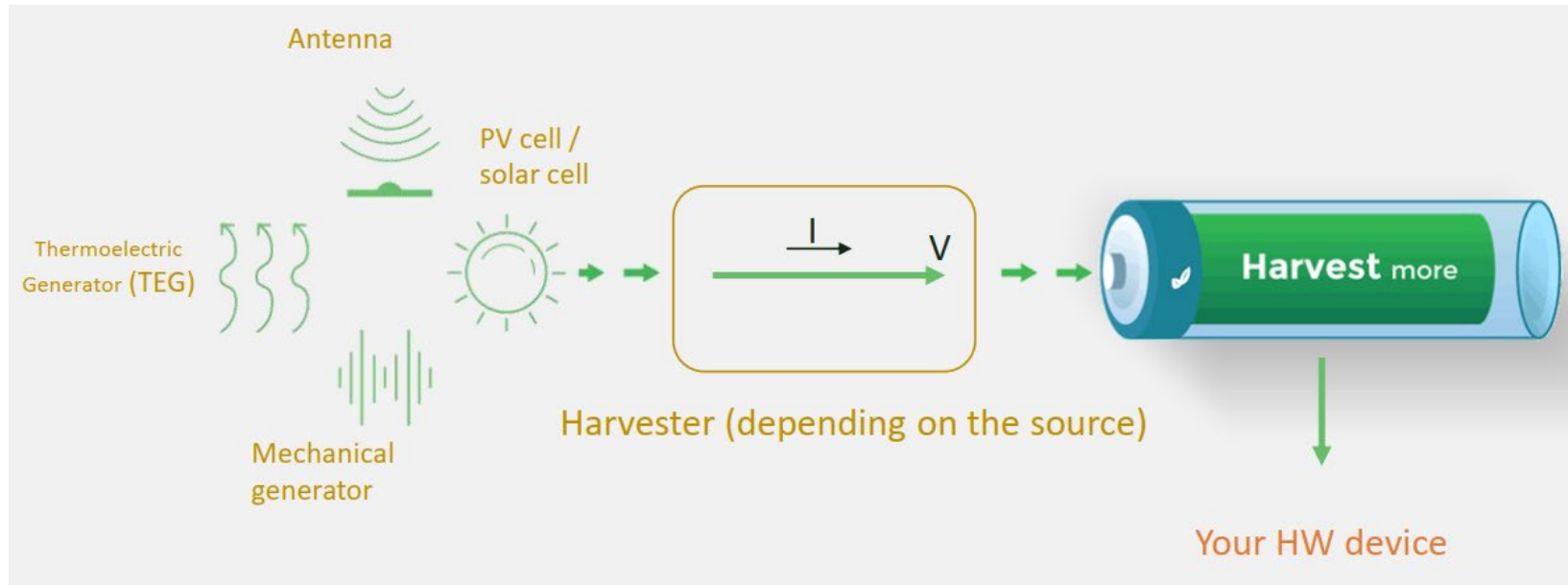


What is Energy Harvesting about ???



-  **Harvest** more energy from **free** sources
-  **Eliminate** battery from **the** device
-  **Extend** battery life of **the** device

What is really needed ???



Energy source with energy collector



Energy converter - PMIC



Energy storage element like SuperCap or Battery

What are the solutions ???

Energy converters

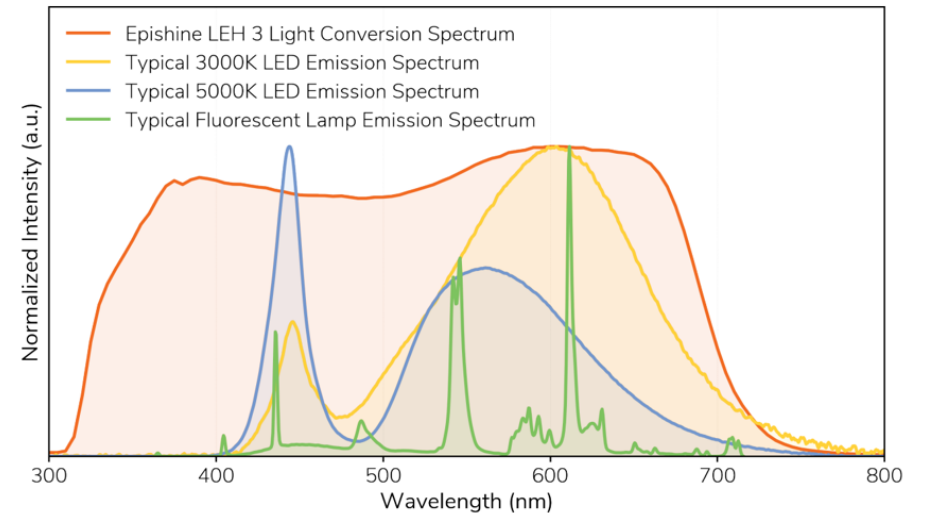






| | Solar/Light | Thermal | AC Sources | Intermittent Sources |
|--------------------------------|-------------|----------|------------|------------------------------------|
| Boost | AEM10941 | AEM20940 | AEM30940 | |
| Buck-Boost | AEM10330 | | AEM30330 | AEM00330 <small>2Q 2022</small> |
| Buck-Boost Battery Charger | AEM10300 | | AEM30300 | AEM00300 <small>2Q 2022</small> |
| Boost Battery Charger Wearable | AEM10900 | | | |

What are the solutions ???

Indoor PV cells

| Product Code | Open Circuit Voltage ^{1,2} (V) | Short Circuit Current ^{1,2} (μA) | Output Power ^{1,2} (μW) | Cells | A (mm) | B (mm) | C (mm) | D (mm) |
|-----------------|---|---|----------------------------------|-------|--------|--------|--------|--------|
| LEH3_50x50_6_10 | 3.8 | 147 | 418 | 6 | 50 | 50 | 71.5 | 60 |
| LEH3_50x50_8_10 | 5.05 | 105 | 375 | 8 | 50 | 50 | 71.5 | 60 |
| LEH3_50x30_6_10 | 3.8 | 88 | 250 | 6 | 50 | 30 | 71.5 | 40 |
| LEH3_50x30_8_10 | 5.05 | 62 | 221 | 8 | 50 | 30 | 71.5 | 40 |
| LEH3_50x20_6_10 | 3.8 | 59 | 167 | 6 | 50 | 20 | 71.5 | 30 |
| LEH3_50x20_8_10 | 5.05 | 42 | 150 | 8 | 50 | 20 | 71.5 | 30 |



| | | | |
|---|---|---|--|
| <p>Low light 50 lux</p>  <p>1,8 μW/cm²</p> | <p>Overhead light 200 lux</p>  <p>7 μW/cm²</p> | <p>Office 500 lux</p>  <p>18 μW/cm²</p> | <p>Supermarket 1000 lux</p>  <p>36 μW/cm²</p> |
|---|---|---|--|



| Question |
|---|
| Which type of source are available in the environment ? (Photovoltaic / thermal / mechanical / RF) |
| Where will the application be placed or used (indoor, outdoor, moving spot) ? |
| Regarding the load, is it already defined (sensors, μ C, radio ?) If so, could you share the part number and high-level schematic ? |
| Could you describe the consumption profile (wake up, active time, passive time) ? When must it be working and when should it be sleeping ? |
| If known, what is the average power consumption of the load ? (mW) Do you know the consumption of each component ? (mW) Did you have measurement of the consumption ? |
| If using radio communication, did you define the protocol ? |
| If using radio communication, at which frequency do you need to communicate ? Do you have any idea of the radio consumption during active time ? (mW) |
| Apart from the radio is there any peak current (due to sensor or the electronic around) ? (Y/N) |
| If yes, please describe the peak current in terms of ampermeter (A) and seconds (s) |
| Which timelife do you target ? (years) |
| Is there any constraint on the start up time (if completely discharged) ? (s) |
| If no power available at the inputs, how long the application must be working ? (hours/days) |
| How much time the device will be used when the power at the source is available (an estimate)? |
| How much time the device will be used when the power at the source is not available? (an estimate) |
| Do you need back-up solution ? (Y/N) |

Energy budget calculation

| Technical details about the system (24 hours) | |
|--|----------------|
| Consumed Energy E LOAD (over 24 hours) | 1.037 J |
| LDO Efficiency | 70% |
| Technical details about the harvester | |
| Energy E SRC (over 24 hours) | 2.204 J |
| Internal BOOST Efficiency | 90% |
| Duration with light available | 8 hours |
| Minimal power required at the harvester P SRC | 76.543 μ W |
| Primary battery as back-up | NA |
| Technical details about the storage | |
| Autonomy without any Power from the Source | 16 hours |
| Stored Energy E STORED | 1.323 J |
| Supercapacitor Size (Between 2.8V and 4.5V) | 213.2 F |
| LIC Size (Between 2.5V and 3.8V) | 323 F |
| Rechargeable Battery (Between 3V and 4.05V) | 102.1 mAh |
| Temperature Working Range | Industrial |

Market segments applications

The infographic is centered around a green circular icon containing a square with a stylized 'C' and a green dot. Below this icon, it states '130+ Active projects'. Surrounding this central element are six market segments, each with an image of a device and a list of applications:

- Mobility**: Asset Tracking, Automotive. Image: A black rectangular device with 'SODAQ' written on it.
- Consumer**: TV accessories, PC peripherals, Smart Homes. Image: A black remote control and a white smartphone.
- Retail**: ESL. Image: A digital price tag showing 'e-peas Origin: Belgium \$ 1.20/kg'.
- Industrial**: Smart Sensors, Smart monitoring. Image: A white square device with a black screen.
- Wearable**: Fitness band, Watch & Smart Watches. Image: Three smartwatches with different bands (black, silver, pink).
- Agritech**: Cattle Tracker. Image: A small orange and white device with a screen.